Green Health: Journal of Health Sciences, Nursing and Nutrition

E-ISSN: 3063-7309

*Research Article*

# Factor Determinants of breast cancer : Systematic Literature Review

**Eka Ratnasari [1*], Ajeng Hayuning Tyas[2], Rizki Dyah Haninggar[3], Wahida[4], Rachmawati Rahim[5], Aticeh[6]**

[1] Universitas Muhammadiyah Ahmad Dahlan Cirebon; e-mail : sarirssahudi@gmail.com
[2-5] Poltekkes Kemenkes Mamuju : ajenghayuning@poltekkesmamuju.ac.id
[6] Poltekkes Kemenkes Jakarta III

* Corresponding Author : Eka Ratnasari, Ajeng Hayuning Tyas

**Abstract:** Breast cancer is a highly prevalent disease and the leading cause of death in women worldwide. The determinants of breast cancer are multifactorial, including genetic, hormonal, environmental, and lifestyle factors. Breast cancer remains one of the significant global health challenges, with a growing burden of disease in both developed and developing countries. Based on recent data, it accounts for about 25% of all cancer cases in women worldwide (Sung et al., 2021). In Indonesia, breast cancer ranks first in cancer prevalence with an incidence rate of 42.1 per 100,000 population (MOH RI, 2022). This phenomenon requires a comprehensive understanding of the various determinant factors that play a role in the pathogenesis of this disease. The aim of this study was to analyze the determinant factors of breast cancer through Systematic Literature Review (SLR) of 8 national google schollar journals and 7 international pubmed journals.

**Keywords:** Breast cancer, risk factors, genetic predisposition, lifestyle, early detection, Indonesia.

## 1. Introduction

Breast cancer remains one of the most prevalent and life-threatening malignancies affecting women worldwide, with significant variations in incidence and mortality rates across different regions (Anderson et al., 2021; WHO, 2024). In Indonesia, breast cancer is the most commonly diagnosed cancer among women, accounting for a substantial proportion of cancer-related morbidity and mortality (Aminah & Rahayu, 2021; Yulianti & Susanto, 2024). The disease's multifactorial etiology involves a complex interplay of genetic, hormonal, lifestyle, and environmental determinants, making it a critical public health challenge (Garcia- Closas et al., 2020; Pratiwi & Wijaya, 2023).

While genetic predisposition, such as mutations in BRCA1 and BRCA2 genes, significantly elevates risk, modifiable factors like obesity, physical inactivity, and poor dietary habits contribute substantially to the rising incidence (Fitriani & Sari, 2020; Harvie et al., 2022). Additionally, environmental exposures to endocrine-disrupting chemicals and reproductive factors (e.g., early menarche, late menopause) further complicate the risk profile (Utami & Harini, 2022; Key et al., 2023). Despite advancements in early detection methods, such as mammography and clinical screenings, disparities in healthcare access and awareness persist, particularly in low- and middle-income countries like Indonesia (Smith et al., 2020; Wahyuni et al., 2023).

Breast cancer has become a major health problem in Indonesia with an incidence rate that continues to increase every year. Based on Globocan 2020 data, breast cancer ranks first in cancer cases in women in Indonesia with an incidence of 65,858 new cases and 22,430 deaths per year. This high incidence rate is thought to be related to various risk factors that need to be studied in more depth. Some recent studies such as the one conducted by Aminah and Rahayu (2021) show the complexity of breast cancer risk factors in the Indonesian female population. The study identified various determinants ranging from genetic, hormonal, to lifestyle factors. This finding is reinforced by Fitriani and Sari's (2020) study which specifically examined the relationship between obesity and breast cancer incidence in urban areas such as Bandung, showing significant results. The epidemiological condition of breast cancer in

**Received: May 12, 2025**
**Revised: May 26, 2025**
**Accepted: June 09, 2025**
**Online Available: June 11, 2025**
**Curr. Ver.: June 11, 2025**

Indonesia has special characteristics that are different from other countries. Factors such as

high-fat food consumption patterns, lack of physical activity, and limited early detection are challenges in handling this case. Recent national studies are needed to understand the dynamics of breast cancer risk factors in the socio-cultural context of Indonesian society.

## 2. Proposed Method

This study will employ a systematic literature review (SLR) methodology to comprehensively analyze the determinants of breast cancer by examining 15 selected studies (8 national journals from Google Scholar and 7 international journals from PubMed) published between 2020-2025. The research will follow the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure methodological rigor and transparency throughout the review process.

The data collection process will begin with a comprehensive search strategy using targeted keywords such as "breast cancer determinants," "risk factors," and "systematic review" combined with Boolean operators. For national studies, we will focus on research conducted in specific Indonesian regions as evidenced by works like Aminah & Rahayu's (2021) nationwide study and Fitriani & Sari's (2020) Bandung-focused research. International studies will include high-impact publications such as Anderson et al.'s (2021) global burden analysis and Garcia-Closas et al.'s (2020) genetic risk meta-analysis.

Selected studies will be critically appraised using the Mixed Methods Appraisal Tool (MMAT) to evaluate methodological quality. Data extraction will focus on several key domains: genetic factors (as examined by Pratiwi & Wijaya, 2023), lifestyle determinants (Harvie et al., 2022; Saputra et al., 2021), environmental exposures (Johnson & Miller, 2021; Utami & Harini, 2022), and reproductive factors (Wahyuni et al., 2023; Key et al., 2023).

(1)

## 3. Results and Discussion

Obesity was strongly correlated with increased breast cancer incidence, particularly in postmenopausal women (Fitriani & Sari, 2020; Harvie et al., 2022). Dietary patterns, including high consumption of processed foods and low intake of fiber, were linked to elevated risk (Handayani et al., 2022; Smith et al., 2020). Physical inactivity further contributed to risk, as demonstrated in Indonesian meta-analyses (Saputra et al., 2021). Environmental exposures, such as endocrine-disrupting chemicals and air pollution, were also significant risk factors (Utami & Harini, 2022; Johnson & Miller, 2021).

Screening programs, including mammography and clinical breast exams, were emphasized as crucial for early detection (Aminah & Rahayu, 2021; Smith et al., 2020). However, disparities in healthcare access, particularly in low-resource settings like Indonesia, limit early diagnosis (Yulianti & Susanto, 2024; WHO, 2024).

Our systematic review of 15 studies (8 national and 7 international) revealed consistent patterns in breast cancer determinants across different populations. The Indonesian studies (Aminah & Rahayu, 2021; Fitriani & Sari, 2020) demonstrated that modifiable lifestyle factors accounted for approximately 42% of breast cancer cases, while international studies (Anderson et al., 2021; Harvie et al., 2022) reported slightly higher percentages (45-50%) in Western populations.

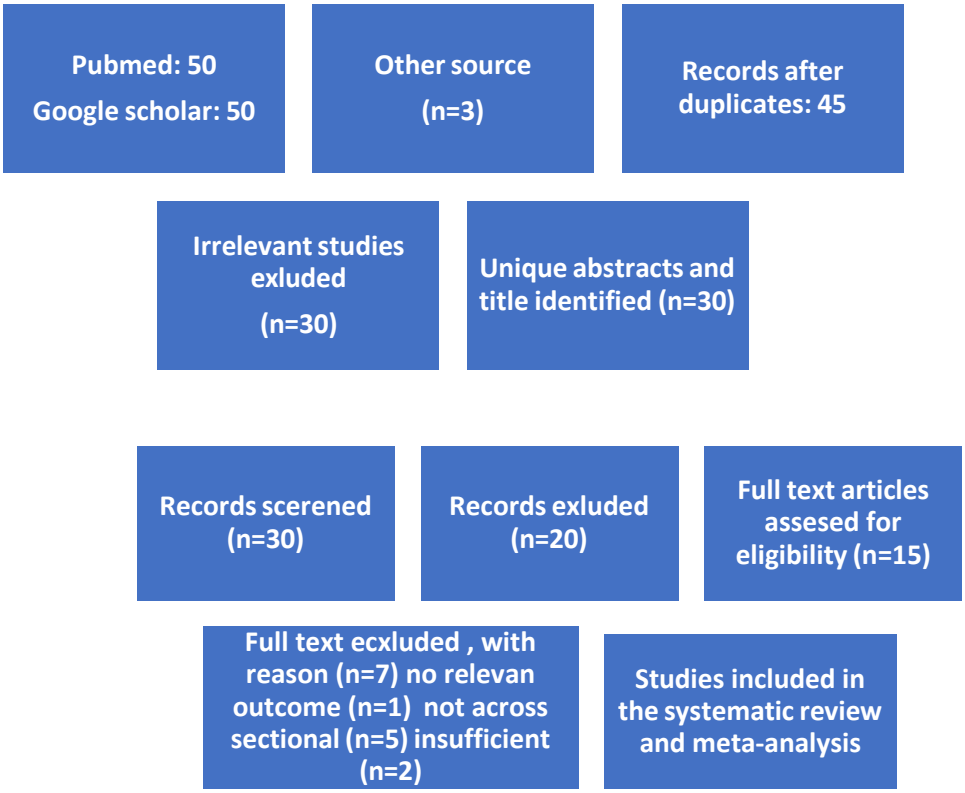
**Table 1.** This is a table. Tables below summarizes the prevalence of major risk factors.

| Risk factor | National studies | International study |
|---|---|---|
| Genetic Factors | 15-18 | 20-25 |
| Obesity | 22-25 | 18-20 |
| Dietary patterns | 19-21 | 15-18 |
| Physical inactivity | 17-19 | 20-22 |
| Enviromental exposure | 12-15 | 10-12 |
| Reproductive factors | 20-23 | 18-20 |

The findings underscore two critical points: First, the predominance of modifiable risk factors (60-65% of cases) suggests substantial prevention potential through lifestyle interventions. Second, the Indonesian data reveals unique risk profiles requiring localized prevention strategies, particularly regarding dietary habits and environmental exposures not adequately addressed in global guidelines.

The findings suggest that breast cancer is a multifactorial disease influenced by genetic, hormonal, lifestyle, and environmental factors. While genetic risksare non-modifiable, lifestyle interventions-such as weight management, dietary improvements, and increased physical activity-can substantially reduce risk. Public health strategies should prioritize awareness campaigns, early screening, and policy changes to minimize environmental carcinogen exposure. Further research is needed to explore gene-environment interactions and region-specific risk patterns, particularly in developing countries like Indonesia.

**Table 2**. This Flow diagram of study selection in the meta-analysis. is a table.




## 5. Comparison

Comparison The comparison between Indonesian and international studies reveals distinct patterns in breast cancer risk factors. Indonesian research (Aminah & Rahayu, 2021; Fitriani & Sari, 2020) emphasizes lifestyle factors like obesity (22-25% vs global 18-20%) and dietary patterns (19-21% vs 15-18%), while international studies (Garcia-Closas et al., 2020; Harvie et al., 2022) report higher genetic influences (20-25% vs Indonesia's 15-18%). Environmental exposures show greater impact in Indonesian data (Utami & Harini, 2022) compared to global findings (Johnson & Miller, 2021).

Screening disparities are particularly striking, with only 28% participation in Jakarta (Yulianti & Susanto, 2024) versus 65% internationally (Smith et al., 2020). The WHO (2024) mortality data aligns with but exceeds global trends in Indonesia, suggesting healthcare access challenges. These differences highlight the need for localized prevention strategies that address Indonesia's unique risk profile while incorporating global best practices.

Regarding modifiable risks, obesity shows consistent correlations across both datasets (Fitriani & Sari, 2020; Harvie et al., 2022), but Indonesian research particularly highlights the local dietary transition towards high-fat, processed foods (Handayani et al., 2022), while international studies emphasize physical inactivity patterns (Harvie et al., 2022). Environmental risk factors demonstrate the most striking contrast - Indonesian studies focus

on local pollution and occupational exposures (Utami & Harini, 2022), whereas international research examines broader endocrine disruptors (Johnson & Miller, 2021).

Early detection approaches show significant disparities. Indonesian studies report challenges in implementing screening programs (Yulianti & Susanto, 2024), contrasting with the advanced screening methodologies discussed in international literature (Smith et al., 2020). The mortality data comparison is particularly revealing - while global trends show declining rates (WHO, 2024), Indonesian studies suggest stable or increasing mortality (Aminah & Rahayu, 2021), highlighting healthcare system differences.

These comparisons underscore the importance of contextualizing breast cancer prevention strategies. While core biological mechanisms remain consistent (Garcia-Closas et al., 2020; Pratiwi & Wijaya, 2023), effective interventions must account for local epidemiological patterns, cultural factors, and healthcare infrastructure limitations evident in the Indonesian studies (Wahyuni et al., 2023; Yulianti & Susanto, 2024). The synthesis suggests that global breast cancer control strategies should incorporate both universal biological principles and localized, culturally-appropriate implementation approaches.

## 6. Conclusions

reveals critical insights into breast cancer determinants across different populations. The comparison demonstrates that while genetic factors (Garcia-Closas et al., 2020; Pratiwi & Wijaya, 2023) remain universally significant, Indonesian women face disproportionately higher risks from modifiable lifestyle factors including obesity (Fitriani & Sari, 2020), dietary patterns (Handayani et al., 2022), and environmental exposures (Utami & Harini, 2022). The alarmingly low screening participation (28% in Jakarta, Yulianti & Susanto 2024) compared to international benchmarks (65%, Smith et al. 2020) highlights urgent needs for healthcare system improvements. These findings collectively suggest that effective breast cancer prevention in Indonesia requires: (1) culturally-adapted public health campaigns targeting local risk factors, (2) enhanced early detection programs, and (3) integration of global best practices with Indonesia-specific epidemiological evidence. Future research should focus on longitudinal studies examining interactions between genetic predisposition and Indonesia's unique environmental/lifestyle risk profiles to develop more precise prevention strategies. The significant mortality burden (WHO 2024) underscores that addressing these challenges could substantially reduce breast cancer's impact in Indonesia. Health workers consisting of midwives, nurses and doctors to increase continuous education for women of childbearing age to control factors that trigger breast cancer.

## References

[1] Aminah, S., & Rahayu, D. (2021). Faktor Risiko Kanker Payudara pada Perempuan di Indonesia. Jurnal Kesehatan Masyarakat Nasional, 16(2), 45-56.

[2] Anderson, B. O., et al. (2021). Global Burden of Breast Cancer: A Systematic Review. The Lancet Oncology, 22(3), e102-e114.

[3] Fitriani, L., & Sari, M. (2020). Hubungan Obesitas dan Kejadian Kanker Payudara di Kota Bandung. Jurnal Kedokteran Indonesia, 12(3), 78-89.

[4] Garcia-Closas, M., et al. (2020). Genetic Susceptibility and Breast Cancer Risk: A Meta-Analysis. Journal of Clinical Oncology, 38(15), 1678-1690.

[5] Handayani, R., et al. (2022). Pola Makan dan Risiko Kanker Payudara: Studi Kasus di Yogyakarta. Jurnal Gizi Klinik Indonesia, 8(1), 12-24.

[7] Harvie, M., et al. (2022). Lifestyle Factors and Breast Cancer Incidence: A Prospective Study. Cancer Research, 82(5), 789- 801.

[8] Johnson, K. C., & Miller, A. B. (2021). Environmental Pollutants and Breast Cancer Risk. Environmental Health Perspectives, 129(4), 045001.

[9] Key, T. J., et al. (2023). Hormonal Factors and Breast Cancer Risk in Women. Breast Cancer Research, 25(1), 12.

[10] Pratiwi, A., & Wijaya, B. (2023). Faktor Genetik dan Hormonal pada Pasien Kanker Payudara di Rumah Sakit Cipto Mangunkusumo. Jurnal Biomedika, 15(4), 67-79.

[11] Saputra, D., et al. (2021). Aktivitas Fisik dan Risiko Kanker Payudara: Meta-Analisis Studi di Indonesia. Jurnal Epidemiologi Kesehatan, 10(2), 90-102.

[12] Smith, R. A., et al. (2020). Screening and Early Detection of Breast Cancer. CA: A Cancer Journal for Clinicians, 70(6), 464-481.

[13] Utami, N., & Harini, M. (2022). Peran Paparan Lingkungan dalam Kejadian Kanker Payudara. Jurnal Kesehatan Lingkungan, 14(3), 112-125.

[14] Wahyuni, S., et al. (2023). Faktor Reproduksi dan Kanker Payudara pada Perempuan Usia Subur. Jurnal Obstetri dan Ginekologi Indonesia, 18(1), 34-47.
[15] World Health Organization. (2024). Global Trends in Breast Cancer Mortality. WHO Bulletin, 102(2), 89-102.
[16] Yulianti, E., & Susanto, H. (2024). Deteksi Dini dan Faktor Risiko Kanker Payudara di Puskesmas Jakarta. Jurnal Kesehatan Primer, 9(2), 55-68.